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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,146	08/04/2003	Brian G. Johnson	ITO.0549US (P16246)	5099
21906	7590	07/03/2006	EXAMINER	
TROP PRUNER & HU, PC 1616 S. VOSS ROAD, SUITE 750 HOUSTON, TX 77057-2631			WEINBERG, MICHAEL J	
			ART UNIT	PAPER NUMBER
			2827	

DATE MAILED: 07/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/634,146	<b>Applicant(s)</b> JOHNSON, BRIAN G.	
	<b>Examiner</b> Michael J. Weinberg	<b>Art Unit</b> 2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☒ Claim(s) 10-31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/4/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 11/7/2003
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on 11/7/2003 was filed after the mailing date of the application on 8/4/2003. The information disclosure statement is being considered by the examiner. However, as there appears to have been a scanning or printing problem, reference "L" has not officially been considered. The listing is not in compliance with 37 CFR 1.98(b)(5) as the complete title, pages numbers, date, and publisher have been cut off. Accordingly, it is requested of the applicant to furnish a new IDS for this reference.

### ***Specification***

2. The disclosure is objected to because of the following informalities:

It is unclear, in page 3, lines 18 and 19, what the phrase "although the terms rows and columns are to some degree arbitrary" means.

A brief summary of the invention is missing from the specification. Guidelines follow:

Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

Appropriate correction or explanation is required.

***Claim Objections***

3. Claims 10-31 are objected to because of the following informalities:

With regard to claims 10 and 11, "a phase change memory" should be "the phase change memory" as there is already antecedent basis for the memory.

With regard to claim 12 and 23 (and depending claims 13-22 and 24-31), it is recommended to change "light accessible" to "light-accessible" in order to differentiate between an accessible memory that is light of weight and the invention of the application. Similarly, "light transmissive" in claim 31 should be "light-transmissive".

With regard to claim 21, there is no antecedent basis for "the memory of claim 11". The claim will be treated as depending from claim 12.

With regard to claim 14, should "laterally spaced" be "parallel spaced" as in claims 2 and 33? Also should "approximate" be "proximate" as the former doesn't appear to make sense?

With regard to claim 28 (and depending claims 29-30), "first and second set" should be "first and second sets".

Appropriate correction or explanation is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 11 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not

described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Specifically, while it is taught in the specification how an optical signal can be converted to an electrical signal, the reverse does not appear to be true of the invention. There is no suggestion that the *phase change memory* can convert an electrical signal to an optical signal (ie create light or allow reading by a light source) and no teaching that would enable one of ordinary skill in the art to accomplish this.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-10, 12-19, 21, 22 and 32-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Lu et al (US Patent 6,850,432).

With regard to **claims 1, 12, and 32**, Lu discloses a method enabling optical and electrical access and device comprising (see abstract):

a light-accessible phase change material<sup>124</sup> (col. 4, line 21); and

a circuit to electrically access said phase change material (abstract, lines 4-5).

With regard to **claims 2, 3, 14, 33, and 34**, Lu further discloses a method composed of forming a device with a pair of parallel spaced electrodes (word lines 126

and conducting plug 122) and a phase change material 124 between said electrodes, the phase change material and said electrodes being arranged laterally. (see figure 1 and col. 4, lines 9-40)

With regard to **claims 4, 5, 18, 19, 35, and 36**, Lu further discloses a device allowing a method enabling light exposure of said phase change material through a thermally insulating material 128 (glass which is an oxide  $\text{SiO}_2$ ). (col. 4, lines 35-36)

With regard to **claim 6**, Lu further discloses a method including enabling said phase change material to be electrically accessed through rows 126 and columns 118 (figure 2 and col. 4, lines 62-66).

With regard to **claims 7 and 15**, Lu further discloses a method and device including locating rows 126 and columns 118 to enable light access to said cells (col. 9, lines 25-31).

With regard to **claim 8 and 16**, Lu further discloses a method used in a device including a positioning one of said rows 126 and columns 118 below said phase change material 124. (The "one" depends on the orientation of the memory.)

With regard to **claims 9 and 17**, Lu further discloses a method used in a device including providing a via coupling one of said electrodes to said underlying row 126 or column 118. (As a via is simply a through connection to another layer, this could comprise 1 or more of plug 122, and layers 114, 116, and 118 in figure 1).

With regard to **claim 10**, Lu further discloses a method including using a phase change memory to convert an optical signal to an electrical signal. (Abstract, lines 1-3-

programming is via light and then this data is converted to electrical signals and read out.)

With regard to **claim 13**, Lu further discloses a memory wherein said phase change material is chalcogenide. (abstract, line 2)

With regard to **claim 21**, Lu further discloses a memory of claim 12 including a plurality of cells (see figure 2) each including phase change material 124, and an optical system to individually expose one memory cell of the plurality of memory cells to a laser light. (In col. 7, lines 9-11, Lu discloses an embodiment wherein cells are addressed a single bit at a time. As a result, one cell would inherently be programmed at a time.)

With regard to **claim 22**, Lu further discloses a memory wherein said circuit includes an addressing circuit (row and column decoders 210 and 212 in figure 2 and col. 1, lines 34-38)

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu in view of Walt (US Patent 6,999,657 with priority back to 5/28/2003).

With regard to **claim 20**, Lu discloses the memory of claim 12 but does not teach a micro-mirror to optically access said phase change memory material.

However, Walt does teach that micro-mirror arrays are commonly used to access optically memories. (column 19, lines 15-42)

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the mirrors of Walt with the memory of Lu in order to accurately reflect laser light into the array to program cells.

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Thakoor et al (US Patent 5,206,829) in view of Lung (US Patent 6,864,503).

With regard to **claim 1**, Thakoor discloses a method comprising:

enabling a memory to be both optically and electrically accessed. (abstract)

With regard to **claim 11**, Thakoor discloses a method of claim 1 further including using the memory to convert an optical signal to an electrical signal. (abstract- optically read, electrically programmed)

Thakoor does not teach that her memory is a phase-change memory, using a ferroelectric film rather than chalcogenide.

However, Lung explains that chalcogenide materials can be both electrically and optically read and written to, similar to ferroelectric film 18 of Thakoor. (column 1, lines 5-16)

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use chalcogenide phase change material in Thakoor in order to have two solid phases that can be sensed (col. 3, lines 32-42).

10. Claim 23-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu in view of Wicker (US Patent 6,867,425).



With regard to **claim 23**, Lu discloses a semiconductor memory including a light-accessible phase change material 124 (col. 4, line 21) and a circuit to electrically access said phase change material (abstract, lines 4-5). Lu does not teach other limitations of claim 23, as shown below.

With regard to **claim 24**, Lu further discloses a memory wherein said phase change material is chalcogenide. (abstract, line 2)

With regard to **claim 25**, Lu further discloses a pair of spaced electrodes (word lines 126 and conducting plug 122), said phase change material 124 between said electrodes. (see figure 1 and col. 4, lines 9-40)

With regard to **claim 26**, Lu teaches (figure 1) a substrate 110, said phase change material 124 positioned over said substrate 110 such that the length of said phase change material 124 is generally parallel to said substrate.

With regard to **claim 27**, Lu further teaches a first set of conductors 118 and a second set of conductors 126, said second set of conductors being generally transverse to said first set of conductors. (fig 2)

With regard to **claim 28**, Lu further teaches that said first 118 and second 126 sets of conductors are arranged to avoid blocking light access to said phase change material 124. (col. 9, lines 25-31)

With regard to **claim 29**, Lu further teaches that one of said sets of conductors (122 or 126 depending on orientation of the cell) is arranged beneath said phase change material 124.

With regard to **claim 30**, Lu further teaches that a via (at least one of 122, 114, 116, and 118) extends from one of said electrodes 122 to an underlying conductor 118.

With regard to **claim 31**, Lu further teaches a substantially light transmissive material 128 (ie glass) over said phase change material 124. (col. 4, lines 35-36)

With regard to **claims 23-31**, Lu does not teach that the memory is coupled to the processor-based device in a system comprising:

a processor-based device;

a wireless interface coupled to said processor-based device;

Wicker, however, does teach a well-known system (figure 16) comprising a processor-based device 910 coupled to a similar phase change memory 100/930 (col. 10, lines 23-35) and a wireless interface 940 (col. 10, lines 36-42).

Thus, it would have been obvious to one of ordinary skill in the art to combine the system of Wicker with the memory of Lu in order to save power by using Lu's energy efficient phase change memory.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Formigoni (US Patent 4,795,657) discloses a phase change memory sufficient to reject several claims.

Von Gutfeld (US Patent 3,778,785) discloses a chalcogenide memory capable of being read and written optically.

Lowrey (US Patent 6,914,255) is relevant copending application of the same assignee.


US PG Pub 2005/0029503 is a relevant copending application of the applicant.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Weinberg whose telephone number is 571-272-6424. The examiner can normally be reached on M-F 9:00 am-5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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